

What is claimed is:

1. Method for treating a moving web in a paper- or boardmaking machine, wherein

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- forming a web on a moving wire,
- removing water from the web by pressing,

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- drying the web by means of at least one dryer cylinder, and

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- subjecting the web to surface treatment by means of at least one technique prior to the first dryer cylinder,

characterized in that

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- arranging the web to travel supported by a transfer belt impervious to water during at least one treatment step prior to said first dryer cylinder.

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2. Method according to claim 1, characterized in that a web treatment substance is applied to the web surface during at least one treatment step prior to the first dryer cylinder and the web is arranged to travel supported by a transfer belt (9) so that the side of the web to which the treatment substance is applied is facing the transfer belt (9), whereby the treatment substance is pressed by means of the transfer belt onto the web.

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3. Method according to claim 1, characterized in that at least one side of the web is calendered against a transfer belt.

4. Method according to claim 1, character-

i z e d in that the web is subjected to a surface treatment while its solids content is in the range of 10 - 60 %.

5 5. Method according to claim 1, 2 or 3, c h a r a c -
t e r i z e d in that the web is dewatered in at least
one step by pressing the web with the help of an endless
felt (14) against the transfer belt (9) by means of press
element (13).

10 6. Method according to claim 5, c h a r a c t e r -
i z e d in that the web is pressed by a felt (14)
against the transfer belt (9) in a shoe press (13).

15 7. Method according to claim 5, c h a r a c t e r -
i z e d in that the web is pressed by a felt (14) by
pressing it against a transfer belt (9) by a roll (12).

20 8. Method according to claim 1, c h a r a c t e r -
i z e d in that the web is dewatered by means of a
noncontacting dryer prior to the first dryer cylinder.

25 9. Method according to claim 1, c h a r a c t e r -
i z e d in that the web is being conveyed at least when
it is dewatered under pressing in a continuous contact
with at least one endless support element such as a wire,
felt or transfer belt

30 10. Method according to claim 1 or 2, c h a r a c -
t e r i z e d in that the web treatment substance is
applied to the surface of the transfer belt (9) by means
of a film-transfer applicator device, spray applicator,
jet applicator or short-dwell applicator, whereby the
treatment substance is applied to the web as a film which
35 travels on the surface of the transfer belt (9).

11. Method according to claim 1 or 9, c h a r a c -

ter i z e d in that the web treatment substance is applied in at least one step directly to the web surface by means of a spray applicator (S1A, S2).

5 12. Method according to claim 1 or 9, c h a r a c -
t e r i z e d in that the web treatment substance is applied directly into the nip defined between the transfer belt and the web.

10 13. Method according to claim 1 or 12, c h a r a c -
t e r i z e d in that the web treatment substance is applied to the transfer belt and when necessary also directly to the web by an amount that forms a pond into the contact angle between the web and the transfer belt.

15 14. Method according to claim 1, c h a r a c t e r -
i z e d in that the web is treated in a calibrating press prior to passing the web to the first dryer cylinder.

20 15. Method according to claim 14, c h a r a c t e r -
i z e d in that the transfer belt (32) is adapted to pass through the nip of the calibrating press (SN).

25 16. Method according to claim 14 or 15, c h a r a c -
t e r i z e d in that the web is treated in a calibrating press having its nip defined between two rolls (20, 21), wherein the treatment substance is applied to one roll (21) of the calibrating press by
30 means of an applicator device (S2) and the treatment substance is subsequently transferred from the surface of the roll (21) to the web.

35 17. Method according to claim 15, c h a r a c t e r -
i z e d in that the web is treated in a calibrating press (SN) having a nip defined between two rolls (20, 21) and a belt (36) adapted to run about one roll (21),

wherein the treatment substance is applied to the surface of the belt of the calibrating press by means of an applicator device (S2) and the treatment substance is subsequently transferred from the surface of the belt (36) to the web.

18. Method according to claim 15, characterized in that the web is treated in a calibrating press (SN) having its nip defined between a roll (21) and a shoe roll (37) having a belt (36) adapted to run about the roll (21), wherein the treatment substance is applied to the surface of the belt (36) of the calibrating press by means of an applicator device (S2) and the treatment substance is subsequently transferred from the surface of the belt (36) to the web.

19. Method according to claim 2, characterized in that the web is adapted to pass through a nip defined between two transfer belts (32, 36) pressable against each other, wherein the treatment substance is applied to the surfaces of both belts (32, 36) and the treatment substance is subsequently transferred to both surfaces of the web.

20. Method according to claim 1, characterized in that the web during a dewatering step performed by pressing is supported at least partially by of a felt, belt, roll, cylinder or air blow/vacuum support means.

21. Method according to any one of claims 1, 8 - 20, characterized in that the web is dried after the application of a treatment substance during the first treatment step by means of a noncontacting dryer such as a radiant heat dryer or air-impingement dryer.

22. Method according to any one of claims 1, 10 - 21,

c h a r a c t e r i z e d in that at least two layers of treatment substance are applied at least to one side of the web during at least two separate web treatment steps.

5 23. Method according to any one of claims 1, 10, 22, c h a r a c t e r i z e d in that at least one layer of a web treatment substance is applied to the web by means of a film-transfer roll (21).

10 24. Method according to claim 1, c h a r a c t e r - i z e d by using a web treatment substance comprising surface size or coating mix in the form of a liquid, dispersion, emulsion or foam.

15 25. Method according to claim 1, c h a r a c t e r - i z e d in that the web is pressed against a roll by means of a transfer belt (9).

20 26. Assembly for a paper- or boardmaking machine, the assembly comprising

- a wire section (2, 3) for forming a moving web of paper or board,

25 - dryer means (4 - 14) for removing water from the web by pressing,

- at least one dryer cylinder (1) for drying the web, and

30 - at least one surface treatment device (S1A, S1B or SN) for treating the surface of the web prior to the first dryer cylinder (1),

35 c h a r a c t e r i z e d by

- at least one transfer belt (9) that is impervious

to water forming an endless loop against which the web is arranged to travel during a surface treatment step.

5 27. Assembly according to claim 26, c h a r a c t e r -
i z e d by means (S1A, S1B) for applying a treatment
substance to the web surface facing a transfer belt (9)
in a manner that causes the applied substance to be
pressed into the web by means of said belt (9).

10 28. Assembly according to claim 26 or 27, c h a r a c -
t e r i z e d in that at least one of a surface
treatment devices is a calender.

15 29. Assembly according to claim 26, c h a r a c t e r -
i z e d by

- a felt (14) adapted to travel against said
transfer belt (9) so that the web to be treated is
20 passed between the felt (14) and the transfer belt
(9), and

- at least one pressing means (13) for pressing the
felt (14) against the transfer belt (9) for removing
25 water from the web by pressing.

30 30. Assembly according to claim 29, c h a r a c t e r -
i z e d in that said pressing means is a shoe press
(13).

31. Assembly according to claim 29, c h a r a c t e r -
i z e d in that said pressing means is a roll (12).

35 32. Assembly according to claim 27, c h a r a c t e r -
i z e d by at least one noncontacting dryer means used
for drying the web prior to the first dryer cylinder.

33. Assembly according to claim 26, c h a r a c t e r -
i z e d by at least one felt (4), wire or belt (9) and
means (5) for picking the web off from a web-forming wire
(2) and passing the same supported by at least one felt
5 (4), wire or belt to the next belt (9), felt or wire.

34. Assembly according to claim 33, c h a r a c t e r -
i z e d by a wire (15) of a group (1) of dryer cylinders
and means (16) for picking the web off from said transfer
10 belt and passing the web at least partially supported by
said wire via said dryer cylinders (1).

35. Assembly according to claim 34, c h a r a c t e r -
i z e d by at least one felt (4) and at least one
15 transfer belt (9) for passing the web in a continuously
supported manner and in continuous connection with said
endless loop support means through a pressing dewatering
step.

36. Assembly according to claim 26, c h a r a c t e r -
i z e d by means for applying a web treatment substance
to the surface of the transfer belt, whereby said means
may comprise a film-transfer applicator, spray applica-
tor, jet applicator or short-dwell applicator device.
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37. Assembly according to claim 26, c h a r a c t e r -
i z e d by at least one spray applicator device (S1A)
located within the area of the pressing dryer means for
applying a web treatment substance directly to the web or
30 into the nip defined between the web and the transfer
belt.

38. Assembly according to claim 26, c h a r a c t e r -
i z e d by a calibrating press (SN) located in front of
35 the dryer cylinders (1) or a calender through which the
web is adapted to pass.

39. Assembly according to claim 38, c h a r a c t e r -
i z e d in that the transfer belt (9) is adapted to pass
through the calibrating press.

5 40. Assembly according to claim 39, c h a r a c t e r -
i z e d by means (S2B) for applying a web treatment
substance on a roll (21) located on the exterior side of
the endless-loop transfer belt (9) of the calibrating
press (SN).

10 41. Assembly according to claim 38 or 39, c h a r a c -
t e r i z e d by a belt (36) adapted to pass as an
endless loop over said roll (21) located on the exterior
side of the endless-loop transfer belt (9) and by means
15 (S2) for applying a web treatment substance on the
surface of said belt (36).

20 42. Assembly according to claim 41, c h a r a c t e r -
i z e d in that said calibrating press (SN) comprises a
shoe press (37).

43. Assembly according to claim 26, c h a r a c t e r -
i z e d by

- 25 - at least two transfer belts (32, 36) adapted to
move at least a portion of their travel opposed to
each other so that the web is passed therebetween,
- 30 - means (S1, S2) for applying a web treatment
substance to the surfaces of the belts (32, 36), and
- means (20, 21) for pressing said belts (32, 36)
against each other for setting up an application
pressure.

35 44. Assembly according to any one of claims 26, 36, 37,
40, 43, c h a r a c t e r i z e d by at least one

noncontacting dryer such as a radiant heat dryer or air-impingement dryer serving to dry the web after the application of a web treatment substance.

5 45. Assembly according to claim 26, c h a r a c t e r -
i z e d by at least one film-transfer roll (21) for
applying a web treatment substance to the web surface.

10 46. Assembly according to claim 26, c h a r a c t e r -
i z e d in that at least one transfer belt is adapted to
pass over the roll in a manner permitting the web to be
pressed by means of the transfer belt against the roll.

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